



DEPARTMENT OF TRANSPORTATION  
NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D. C. 20591

OFFICE OF  
THE CHAIRMAN

AUG 28 1970

Honorable John H. Shaffer  
Administrator  
Federal Aviation Administration  
Department of Transportation  
Washington, D. C. 20590

Dear Mr. Shaffer:

Some time ago the Safety Board received a copy of the Nader group report entitled "Crash Safety in General Aviation Aircraft." Our staff has reviewed this report and found it to be comprehensive. The findings of the report form the basis for the petition filed with the FAA by Mr. Ralph Nader. The purpose of this letter is to convey to you our views on general aviation crash safety so that you may consider them during your deliberation on the action to be taken with respect to the Nader petition.

Our view is that the aircraft manufacturers, on the one hand, have concentrated their efforts on the airworthiness aspect of their product, and have minimized their efforts to provide realistic levels of crash-worthiness. Medically-oriented researchers and crash safety specialists, however, have built up a considerable body of technical data showing that significant savings in lives and injuries can accrue to improved crash-worthiness in the design of aircraft. Much of this data has been developed by your agency at CAMI and NAFEC and through FAA-sponsored research grants.

The Federal Air Regulations, however, still only provide protection for "a minor crash landing." We recognize that you are required by statute to regulate only minimum standards for air safety as contrasted with optimum standards. Also, we know that you must have good cause before you change the existing regulations. However, we believe that it is time to take a new look at minimum standards as they are applied in the general aviation crash safety field. In the light of the aforementioned crash safety research data, we think that the existing crash safety standards in FAR Part 23 do not encourage practical applications of existent state of the art. The National Highway Safety Bureau, with essentially the same basic data that the FAA now possesses, has forged ahead in the automotive field to provide substantial crash-worthiness protection for occupants of automobiles.

Accordingly, we recommend that you reevaluate your position on minimum general aviation crashworthiness standards, considering at least the following points:

1. Shoulder Harnesses

Shoulder harnesses should be required on all general aviation aircraft at the earliest practical date. The recent Amendment 23-7 is a step in the right direction but does not go far enough. The draft report made by your Dr. John Swearingen on crash injury further provides corroborative proof of the benefit of shoulder harnesses in general aviation aircraft.

2. Delethalization of Aircraft Interiors

Suitable energy-absorbing padding should be required on all interior structures to protect the occupants. All protuberances likely to cause injury should be eliminated or suitably recessed. Dr. Swearingen's recent work highlights the injury saving potential of such crashworthiness design features.

3. Dynamic Testing of Seats

Considerable research data are available, pointing to the need for dynamic testing of aircraft seats. Static tests alone are not realistic, and cannot directly be related to crash environments. These conclusions are verified by the work covered in your Aircraft Development Service Report NA-69-5, "Dynamic Test Criteria For Aircraft Seats." Therefore, we request that you initiate regulatory action to implement the recommendations in this report.

4. Emergency Landing Conditions

Regulatory action should be initiated to raise the "minor crash landing" inertia forces of FAR 23.561 to a level comparable to those produced by a moderate-to-severe crash landing. Until a reasonable crash design condition is decided upon, including a specified crash acceleration pulse, we suggest that the longitudinal inertia force be raised to 20 to 25 g, and the forces about the other axes be similarly increased. The inertia forces specified in Table 1-1 of the U. S. Army Aviation Material Laboratories Technical Report 67-22, "Crash Survival Design Guide" could well serve as the basis for a civil aircraft crash design condition.

5. Crash Fire Protection

Fuel tanks and fuel systems should be designed to minimize the spillage of fuel in moderate to severe crashes. Materials used in

aircraft interiors should not support a self-sustained combustion, and should not give off toxic fumes. Further, fuel ignition should be minimized by requiring the circuit isolation of electrical energy sources in crashes.

In summary, the research conducted by the FAA and the U. S. Army has been informative. The time has come now to recognize the validity of the total accident and research findings in the field of aircraft occupant crash protection.

When you complete your evaluation of the Nader petition, we would appreciate a report on your findings and intended action.

Sincerely yours,

Original signed by  
John H. Reed

John H. Reed  
Chairman